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The effect of past behavior on variety seeking: Automatic and deliberative influences

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Abstract

Consumers often make multiple purchases of products to use over a period of time. In doing so, they sometimes choose their most preferred option for use on each occasion. In other cases, however, they are likely to distribute their choices over several alternatives. These decision strategies could be applied either deliberately or spontaneously without awareness of the factors that give rise to their application. Three studies examined the conditions in which these spontaneous and deliberative processes exert an influence on variety seeking.

Consumers' purchase decisions can be influenced by not only the information they receive about the choice alternatives but also the procedure they use to decide between these alternatives. For example, they might sometimes choose the alternative that is superior along the greatest number of dimensions. Alternatively, they might compute the desirability of each alternative independently and compare the magnitudes of these overall evaluations (Park & Kim, 2005). Furthermore, when consumers are able to choose a number of products, they might either identify the type of product they like best and choose it repeatedly or might select a variety of different ones. The outcome of their decision can depend on which procedure they employ.

Consumers may often deliberatively choose a strategy based on its applicability to the particular type of stimuli they are considering or their feelings about using it. Sometimes, however, they may apply a strategy spontaneously without thinking about the reason for selecting it. In this paper, we were concerned with the interplay of deliberative and spontaneous decision processes in a multiple choice situation and the conditions in which each is likely to predominate. We were particularly interested in the extent to which individuals' decision-relevant behavior in one situation is likely to influence the decision rule they apply in a later, often quite different situation.

Several studies (Drolet, 2002; Shen & Wyer, 2008a; Xu & Wyer, 2007, 2008) have investigated this influence. However, these studies typically focused on *either* the spontaneous, nonconscious choice of a decision strategy *or* the conscious and deliberate choice of a strategy but not both. Xu and Wyer (2008), for example, found that participants who had compared the physical attributes of animals were more likely than other participants to purchase one of several types of products that were on sale after the experiment. In a quite different situation, Shen and Wyer (2008a) found that inducing participants to rank order students' grades either from highest to lowest or from lowest to highest affected the order in which participants processed the information they received in a quite different product domain and, therefore, the effect of this information on their judgments. In these studies, however, participants had little if any awareness that the strategy they employed in the second task was influenced by their processing of information in the first one.

In contrast, people are sometimes quite conscious of their past behavior and deliberately use it as a basis for deciding how to behave in a similar situation they encounter later. In this case, however, they are likely to decide to apply a procedure they have previously used only if they consider it to be relevant. Moreover, they may sometimes be bored with applying it and,

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therefore, may decide to use a different procedure that is equally applicable. In this regard, Drolet (2002) found that many individuals have a chronic preference for uniqueness that disposes them to deliberately choose a *different* strategy for use in making decisions in one situation than they have used in an earlier situation. Although feelings of boredom are situation specific, they may operate in a similar way. That is, individuals who become bored with the use of a particular decision strategy may intentionally apply a different one in order to relieve these feelings.

In short, both automatic and deliberative processes can underlie the effects of using a response strategy at one point in time on its use at a later time. However, these effects can differ and can potentially offset one another. To understand the effects of using a past response procedure on its use in a new situation, it is necessary to conceptualize the conditions in which both conscious and nonconscious processes come into play and the factors that influence their relative contributions.

To examine these factors, we chose a domain of particular importance in consumer judgment and decision making. Grocery shoppers often stock up on daily consumables in order to avoid making repeated trips to the store. In doing so, they are often called upon to decide whether to use the same product of a given type on each occasion or to use a variety of functionally equivalent ones. Their decision undoubtedly depends in part on the type of product they are considering. (For example, consumers are likely to use the same brand of yoghurt or bottled water every day, but to choose a different vegetable to eat for dinner each evening.) In many product domains (e.g., tea), however, consumers' decisions to seek variety may vary over time and situations. In this case, the strategy they have applied in an earlier, unrelated situation may influence these decisions. Three experiments identified both automatic and deliberative processes that underlie the impact of a previously used decision strategy on subsequent decisions and the factors that influence their impact.[1]

Theoretical background

To reiterate, consumers who have occasion to choose products for use at different points in time might sometimes identify the product that they prefer most and choose it consistently without considering other options. Alternatively, they might first choose the option they like best but then might switch to less preferable options for the sake of variety. Both strategies may be well learned and may be stored in memory independently as part of one's procedural knowledge. Consequently, when both procedures are equally applicable, the likelihood of applying them may be influenced in part by how easily they come to mind. This, in turn, may increase with the frequency and recency with which the procedures have been applied in the past (Higgins, Bargh, & Lombardi, 1985; Srull & Wyer, 1979).

The effects of these factors are not as straightforward as they might appear, however. To understand these effects, it is necessary to distinguish between (a) the spontaneous selection and application of a decision strategy that occurs with little if any cognitive deliberation and (b) the conscious and deliberate use of a decision strategy. Although the frequency and recency of applying a procedure in a past situation can affect both the automatic application of the procedure in a later situation and the deliberate decision to do so, these effects can often be opposite in direction.

Spontaneous effects of past behavior on future behavioral decisions

To reiterate, the decision strategy that people apply in a particular situation is partly determined by how quickly and easily it comes to mind. Research on the determinants and effects of knowledge accessibility is extensive (for reviews, see Bargh, 1997; Higgins, 1996; Wyer, 2008), and several theoretical formulations have been proposed to describe the processes that underlie these effects (Dijksterhuis & Bargh, 2001; Higgins et al., 1985; Wyer & Srull, 1989; Wyer, 2004). However, these conceptualizations have largely been devoted to the accessibility of *declarative* knowledge (concepts, beliefs, attitudes, etc.) that is consciously applied in the processing of new information to which it is applicable. A consideration of the cognitive procedures that operate on this information has rarely been investigated, particularly in consumer behavior research (for an exception, see Shen & Wyer, 2008a). The representation and use of procedural knowledge in memory and the manner in which it comes into play may differ from the representation and use of declarative knowledge.

Our conceptualization of cognitive procedures is similar to that proposed by Anderson (1983; see also Smith, 1990). That is, we assume that people acquire a number of cognitive and motor rules that, once learned, are often applied spontaneously in performing activities to which the rules are applicable. These rules have the form of "*If* [X], *then* [Y]" *productions*, where [X] is a configuration of perceptual and cognitive features and [Y] is a sequence of cognitive or motor acts that is elicited automatically when the precondition [X] is met. The features of [X] can include both (a) a specification of a goal to which the actions are relevant and (b) situational factors that are incidental to the task being contemplated and of which people might not even be consciously aware (Bargh, 1997; Dijksterhuis & Bargh, 2001).

When two or more alternative productions can potentially be used to attain a particular objective, the production that is applied can depend on whether the features that compose its precondition ([X]) are accessible in memory. In a multiple-choice decision situation, for example, the alternative

[1] It is important to distinguish between the variety of options that result from applying a given decision strategy and variation in the strategy that is applied. A consumer who consistently chooses a variety of options in each of a number of different situations, and a consumer who chooses the same option repeatedly in each situation, both use a consistent decision rule although the effects of applying this rule differ. In contrast, a consumer who chooses the same option repeatedly in one situation but chooses a variety of alternatives in a second situation is presumably applying different decision rules. We are interested in the situational factors that lead different strategies to be applied independently of the type of product being considered.

productions that could be applied might have the form "*if* [choose A], *then* [choose A]", and "*if* [choose A], *then* [choose not-A]," where A is a given choice alternative. The accessibility of these productions, like the accessibility of knowledge more generally, may be a function of the frequency and recency with which it has been applied in the past (Higgins et al., 1985; Srull & Wyer, 1979). Semantic concepts alone can often be sufficient to elicit a production. (For evidence that variety seeking can be affected by the accessibility of semantic concepts, see Fishbach, Ratner, & Zhang, 2007; Maimaran & Wheeler, 2008.) However, past behavior can do so as well. Thus, suppose a production has recently been applied in the course of cognitive activity in one situation. The activation of its precondition in a later situation may lead it to be spontaneously elicited and applied in this situation as well. Furthermore, the more frequently it has been applied in the first situation, the more accessible in memory it becomes and the greater the likelihood of its subsequent application. The response strategies elicited by such productions could be activated and applied with little cognitive deliberation.[2]

These considerations suggest the following hypothesis:

H1. The likelihood that a response strategy is spontaneously applied in a situation will increase with both the recency and the frequency with which it has been applied in the past.

Effects of cognitive deliberation on strategy selection

Productions of the sort considered in the previous section are most likely to be applied when individuals do not think about the procedure they employ and the reason for doing so. In many situations, however, situational factors are likely to call their attention to the alternative procedures they might use and lead them to deliberate on the one they should select. Then, their use of a past response procedure as a basis for the strategy they apply in a new situation may depend on whether the earlier procedure is salient to them and, if so, their motivation to apply it. This, in turn, may vary with both (a) their perception of its relevance to the situation at hand and (b) the affective reactions they anticipate experiencing if they employ it. These factors, like those that influence the application of a production may depend on the frequency and recency with which the strategy has been applied in the past.

Perceptions of relevance

When individuals are aware that the concepts and knowledge that come to mind when they process information are influenced by extraneous factors, they apply them only if they are either unmotivated or unable to search for alternatives (Martin, Seta, & Crelia, 1990). Otherwise, they are likely to avoid using the concepts in order to be unbiased (Lombardi, Higgins, & Bargh, 1987). Similar circumstances could arise in the present context. That is, people often do not think about their behavior in an earlier situation when they decide how to proceed in a new one. However, if their past behavior is called to their attention, they may think about its relevance and apply it only if they perceive the two situations to be analogous. If they perceive the situations to be unrelated, they may consciously choose a different strategy to avoid being inappropriately influenced. These considerations qualify the first hypothesis:

H2. If individuals' attention is called to their behavior in a previous situation, they will use it as a basis for deciding how to behave in a new situation only if the situation is similar to the first. Otherwise, they will intentionally avoid being influenced by the behavior they performed earlier.

An additional consideration arises. Some individuals appear to have a chronic need for uniqueness and may generally avoid reapplying a decision strategy they are conscious of using earlier (Drolet, 2002). This could be true even if the situations in which the strategies are applied are unrelated. In the present research, however, individual differences in the need for uniqueness were controlled.

Effects of boredom

Unless situational factors direct individuals' attention to their behavior in a previous situation, they may not think about it at all, and so the effect of a production that was activated in this situation on their later behavior should be apparent. However, when individuals have applied a procedure very frequently a short time before confronting a new situation, they not only may be conscious of using the procedure but also may be bored with it. Consequently, all things being equal, they may adopt a different procedure in a new situation to avoid the negative feelings they would experience if they continued to use it. An analogy is suggested by Berlyne's (1970) two-factor theory. This theory suggests that lower levels of message repetition could increase consumers' positive response toward the message, whereas higher levels of repetition would elicit feelings of boredom that might decrease message effectiveness. In the present context, the effects of boredom with a procedure, and thus the disposition to adopt a different procedure, should increase with the number of times the procedure has been applied. To this extent, however, these effects are opposite in direction to the effects of frequency implied by Hypothesis 1. The question is which effect—the deliberative attempt to change one's response strategy to relieve feelings of boredom, or the automatic effect that results from the activation of a production—is likely to predominate.

Although the relative effects of feelings and procedural knowledge have received little attention, some research is suggestive. Baumeister, Schmeichel and Vohs (2007) suggest that exercising self-regulation can temporarily induce fatigue and consequently can decrease self-control in situations that occur immediately afterwards. At the same time, self-regulatory behavior can strengthen the cognitive processes involved in it

[2] Although the choice of a production-activated decision strategy may be activated spontaneously, the *implementation* of this strategy may be deliberative. Obviously, the choice of either the same or different products requires some cognitive effort and awareness of the choices being made. Nevertheless, the adoption of the general decision strategy (to choose the same option repeatedly or different options) can often be made with little conscious awareness of the reason for its occurrence.

and consequently can increase self-control once the initial fatigue has dissipated (Muraven, Baumeister, & Tice 1999). If the increased accessibility of a production that results from repeatedly applying it is analogous to strength, and boredom with applying it is analogous to fatigue, the effects we postulate may be similar to those postulated by Baumeister et al. (2007). That is, feelings of boredom may be intense a short time after repeatedly applying a procedure. However, these feelings are likely to dissipate over time, and the effects of a production, which may be strengthened by applying the procedure, may be more apparent (Smith, 1990). These considerations give rise to the following hypothesis:

H3. The frequency of employing a decision strategy will have a negative impact on its application in a new situation that occurs a short time later, but its positive effect that results from the accessibility of a production will be apparent after a period of time has elapsed.

The present research

To summarize, our conceptualization implies that the effect of employing a decision strategy in one situation on the likelihood of reapplying it in a later situation is theoretically a joint function of both automatic and deliberative processing. The use of a procedure in one situation may activate a production that is likely to be applied spontaneously in a later situation in which it is applicable, and this may be true regardless of the similarity of the two situations. However, if individuals become aware of the procedure they have applied in the earlier situation (either because it is called explicitly to their attention or because of the feelings of boredom it elicits), they may often deliberately consider whether they want to continue using the strategy or switch to a different one. The effects of this cognitive deliberation could override the spontaneous application of a strategy that occurs as the result of activating a production.

We investigated these possibilities in the research to be reported. Participants initially performed a task in which they were likely to make the same response repeatedly over a series or trials or to make different responses on each trial. After doing so, they were exposed to a product choice task in which they were asked to make choices of the products they would use on each of four consecutive days. Experiment 1 tested the combined implications of Hypotheses 1 and 2, whereas the second two experiments confirmed the effects of feelings of boredom on the deliberate use of a decision strategy and evaluated the implications of Hypothesis 3.

Experiment 1

Experiment 1 examined the implications of Hypotheses 1 and 2. Our conceptualization assumes that individuals do not think about their behavior in a previous decision task at the time they encounter a new one, the strategy they apply to the new task will be governed by a production that is activated in the course of performing the first one. However, if participants' attention is drawn to the strategy they applied in the initial task, the strategy they apply in the second one will depend on their perception of its relevance, as inferred from the relevance of the tasks being performed.

To investigate this possibility, participants were exposed to an initial choice task in which they were induced to make the same choice repeatedly over a series of trials or a different choice on each trial. In *related-priming* conditions, participants were asked to choose products for use on each of several days that were either likely to be the same on each day or likely to vary. In *unrelated-priming* conditions, participants answered a series of questions about animals that required either the same answer each time or a different answer each time. Finally, participants' behavior was unobtrusively called to their attention in some conditions but not in other conditions. All participants then performed a product choice task similar to the one administered under related-priming conditions.

We assumed that both priming procedures would induce a disposition either to use a response strategy similar to the procedure that was primed. We further expected that when participants' attention was called to their past choice behavior, the effect of the primed behavior on the decision strategy they employed in the target task would depend on whether they considered it to be relevant. That is, they would apply the strategy they had used in the first task when the two tasks were similar but not when they were dissimilar. When participants' attention was *not* called to their past behavior, however, they were expected to apply the production that was activated by their responses in the priming task regardless of the similarity of the two tasks.

Method

One hundred fifty-two Hong Kong university students were randomly assigned to conditions of a 2 (primed decision rule: same choice vs. different choice) × 2 (the relatedness of the priming task to the target task) × 2 (attention to past behavior) between-subjects design.

Procedure, related-priming conditions

As noted earlier, participants' tendency to choose either the same or different products repeatedly over a series of instances is likely to depend in part on the type of product they considered. To manipulate the disposition to employ these strategies, we capitalized on this difference.

On the basis of pretesting, we selected three product categories in *different-response* priming conditions in which participants were likely to choose different products (juices, tonic drinks, and fruit). In *same-response* priming conditions, we selected three categories in which participants were likely to choose the same option repeatedly (milk, types of bottled water, and brands of bottled water). Four alternative products were then selected within each of these categories. (In the juice category, for example, the options were orange, peach, apple and grapefruit. In the milk category, four familiar local brands were selected as options.).

Participants in each priming condition were introduced to task with instructions that "…when people go shopping for groceries, they often purchase food for several days at a time [and] have to decide ahead of time what they are likely to want on each day. We are interested in how this is done. Among each category, please choose one product on each of the next four days." On this pretense, they were asked to make choices in each of the three categories selected for use in the priming condition to which they were assigned.

Procedure, unrelated-priming conditions

The experimenter in this condition introduced the study with instructions that the Hong Kong animal protection organization was interested in the knowledge that students had about animals. On this pretense, participants were given three sets of four questions each. To answer each question, they were asked to compare four animals. In same-response priming conditions, the same animal was correct for each question in a set. (For example, "Which animal is larger: a dog, a tiger, a chicken, or a pig?" "Which animal is most hostile: a dog, a tiger, a chicken, or a pig?") In different-response priming conditions, a different animal was correct for each question in a set. (For example, "Which animal is larger: a dog, a tiger, a chicken, or a pig?" "Which animal is most loyal: a dog, a tiger, a chicken, or a pig?").

Then, after performing the priming task, participants in *attention* conditions were given a list of the products (or animals) they had considered in the priming task and were asked to write down the number of times they had chosen each. We expected this task to sensitize participants to the variety of responses they had made. In contrast, participants in *no-attention* conditions were simply asked to recall the names of two products (animals) in each category without considering how often they had chosen them.

Target task

Finally, participants in all conditions received a second shopping questionnaire similar to that administered in related-priming conditions and were asked to choose which of four types of herbal tea they would prefer to drink on each of the next four days. Pretesting indicated that this category was one that participants were about equally likely to make similar choices or different choices over the four day period. The number of different choices made in this category was used as an indication of variety seeking.

Results

Manipulation check

Participants in the initial priming task chose a greater number of different options under different-response priming conditions than under same-response priming conditions (3.19 vs. 1.60, respectively), F (1, 144)=255.95, $p<.0001$. Although this difference was greater when participants answered questions about animals (3.50 vs. 1.33, respectively) than when they made product choices (2.88 vs. 1.85, respectively), it was significant in both cases ($p<.0001$).

Variety seeking in the target task

The number of different product choices in the target task is shown in Table 1 as a function of the primed response strategy, prime-target relatedness, and attention. The three-way interaction of these variables was significant, F (1, 144)=3.88, $p<.05$, and consistent with expectations. When participants' responses to the priming task was called to their attention and this task was similar to the target task, the variety of their choices in the target task was greater when they had repeatedly made different choices in the priming task than when they had repeatedly made the same choice (2.89 vs. 2.16, in different-response vs. same-response priming conditions, respectively), F (1, 144)=4.81, $p<.03$. When the target and priming tasks were ostensibly unrelated, however, the priming task had no effect at all (2.63 vs. 2.90, respectively, $F<1$). The interaction of priming task relevance and the primed response rule was significant under attention conditions alone, F (1, 144)=4.61, $p<.03$.

In contrast, when participants were not stimulated to pay attention to their past behavior, they were more likely to choose different options in the target task in different-response priming conditions than in same-response priming conditions (2.90 vs. 2.42, respectively), F (1, 144)=4.58, $p<.03$, and this effect did not depend on whether the two tasks were related or not ($F<1$).

Supplementary data

Our interpretation of the results of Experiment 1 assumes that participants would perceive their choice behavior in the priming task as relevant to their preference for variety seeking only if this task is related to shopping. To validate this assumption, we induced 65 participants to make either the same-response option repeatedly or different responses repeatedly under both related-priming and unrelated-priming conditions similar to those employed in the main experiment. Then, after performing this task, they were instructed that: "When consumers purchase a lot of products at a time, some may want to choose their most preferred option every time, whereas others may want to choose different options. We want to know what type of consumer you are." On this pretense, participants were asked to indicate the extent to which they preferred choosing different options over choosing their most preferred options repeatedly along a scale from −3 (choose most preferred option) to +3 (choose different options).

Table 1
Variety seeking as a function of primed decision rule, prime relatedness, and attention— Experiment 1.

	Attention		No attention	
	Related prime	Unrelated prime	Related prime	Unrelated prime
Primed decision rule				
Different choice	2.89	2.63	2.90	2.90
Same choice	2.16	2.90	2.55	2.25
M_{diff}	.73	−.27	.35	.65

The results were consistent with our assumption. That is, in related-priming conditions, participants reported a stronger preference for variety seeking in general if they had been induced to make different responses repeatedly during the priming task ($M=.56$) than if they had been induced to make the same response repeatedly ($M=-.56$, F (1, 61)=4.24, $p<.04$). However, this effect was not at all evident in unrelated-priming conditions (−.50 vs. −.12, respectively; $F<1$). The interaction of prime relatedness relevance and the primed decision rule was significant (F (1, 61)=3.86, $p<.05$). Thus, participants were more likely to infer their general preference for variety seeking from their past behavior if the priming task was related to shopping than if it was not.

Experiment 2

Experiment 1 confirmed the implications of Hypotheses 1 and 2. That is, when participants' attention was called to their past behavior, they only used this behavior as a basis for selecting the decision strategy they employed subsequently when they perceived it to be relevant. When their attention is not directed to their past behavior, however, their behavior in the priming task apparently activated a production that influenced the decision strategy they spontaneously employed in a performing a later task even when the two tasks were ostensibly unrelated.

However, people's attention to their past behavior can be drawn to their past behavior for other reasons, as implied by Hypothesis 3. In particular, if the repeated use of a procedure elicits feelings of boredom and participants continue to experience these feelings at the time they decide how to perform in a new situation, they may intentionally select an alternative strategy in order to avoid becoming bored further. Feelings of boredom dissipate fairly rapidly over time, however, whereas the effects of a production are likely to persist (Smith, 1990; see also Srull & Wyer, 1979). Consequently, the effects of the production that is spontaneously activated by the initial priming task may become more apparent as time goes on.

The next two experiments examined this possibility. Experiment 2 confirmed the assumption that a greater number of repetitions of the primed response strategy could elicit feelings of boredom and that the effects of these feelings on the strategy that participants chose to use in the target task could override the effects of the production that the priming task had activated. Experiment 3 showed that feelings of boredom are more transitory than the production that is activated by the priming task. As a result, the effects of the production reappeared after a period of time had elapsed and the feelings of boredom had dissipated.

Pretests

We did two pretests to test this assumption that the repeated use of a procedure will induce feelings of boredom. In pretest 1, Thirty-six participants answered four sets of questions about animals, similar to unrelated-priming conditions in Experiment 1. In same-response and different-response conditions, the answers to questions in each of the four sets were always same or were always different, respectively. In a third, *mixed-response* priming condition, the same answer was correct for each question in the first and the third sets, but a different answer was correct for each question in the second and fourth sets. Thus, participants in the first two conditions were induced to choose the same thing or different things repeatedly, whereas participants in mixed-choice conditions were induced to change the rule they used in answering questions over the four stimulus sets. After finishing this task, participants were asked to indicate how interesting the task was along scales from 1 (not at all) to 7 (very much). We found that participants rated the task as more interesting in mixed-choice condition ($M=4.18$) than in different-choice conditions ($M=3.33$) or same-choice conditions ($M=3.38$) combined, F (1, 34)=2.95, $p<.10$, whereas the latter two conditions did not differ from one another ($F<1$). These results suggested that repeated use of a decision rule can lead participants to feel bored about applying that rule.

Another pretest was done to investigate whether feelings of boredom will increase as the number of repetition increases. In this study, thirty-two participants answered six sets of questions about animals. In same-response and different-response conditions, the answers to questions in each of the six sets were always same or were always different, respectively. However, participants were told that we were interested in their feelings at different times during the experiment. To this end, we repeatedly measured how bored participants felt after they only completed three sets of questions and after they completed all of the six sets of questions along a scale from 1 (not at all) to 7 (very bored). A repeated-measures analysis showed that participants felt more bored after they completed six sets of questions than three sets of questions (4.06 vs. 3.56 respectively, F (1, 30)=7.86, $p<.01$). This effect was evident regardless of whether they had made the same response repeatedly to the questions they were asked or had made different responses repeatedly ($F<1$). This result suggests that a greater number of repetitions of a decision strategy could increase feelings of boredom. To this extent, participants should be motivated to eliminate these negative feelings by switching to a different decision rule on a later task. The main experiment evaluated this possibility.

Method

Procedure

Seventy-six Hong Kong university students participated in the experiment. Two priming conditions were constructed similar to those employed in unrelated-priming conditions of the first experiment. However, participants answered *six* sets of questions about animals instead of three sets that were used in the first experiment. We used six sets because we are only interested in the effect of feelings of boredom in this experiment and assumed that a great number of repetitions of decision strategy are necessary to make the effect of boredom override the effect of a production.

In same-response and different-response conditions, the answers to questions in each of the six sets were always same or

were always different, respectively. Thus, participants in these conditions were induced to choose the same thing or different things repeatedly. After finishing this task, all participants were asked to indicate how bored they felt at that moment along a scale from 1 (not at all) to 7 (very bored).

Participants were then given instructions similar to those used to introduce the pretest of Experiment 1 and were asked to choose the type of green tea they would like to drink on each of the next four days from a set of four alternatives. The number of different choices that participants made in this category was again used as an indication of variety seeking.

Results

Manipulation check

The decision rule was manipulated successfully. Participants were more likely to choose different animals in different-choice priming conditions ($M=3.71$) than in same-choice priming conditions ($M=1.31$, F (1, 74)$=883.53$, $p<.0001$).

Feelings of boredom

As expected, participants felt equally bored after finishing the priming task regardless of whether they had made the same response repeatedly to the questions they were asked ($M=3.69$) or had made different responses repeatedly ($M=4.07$, $F<1$).

Variety seeking in the second task

We expected that if participants felt bored as a result of using the same-response strategy repeatedly for six times, they would switch to a different decision rule when performing a later task in order to eliminate these negative feelings. This was actually the case. Participants were more likely to choose different options in the shopping questionnaire if they had previously chosen the same animal repeatedly ($M=3.14$) than if they had chosen different animals repeatedly ($M=2.57$, F (1, 74)$=6.55$, $p<.01$).

Mediating role of boredom

The mediating effect of boredom on choice behavior was confirmed on the basis of correlational analyses. According to our assumption, participants who felt bored about making the same response repeatedly in the priming task would be more likely to choose different products in the target task, whereas those who felt bored when making different responses repeatedly would be less likely to do so later. This was actually the case. The correlation between feelings of boredom and the number of different products that participants chose in the target task was positive in same-response priming conditions ($r=.33$, $p<.05$) but was negative in different-response priming conditions ($r=-.27$, $p<.10$).

To evaluate the overall effect of boredom on choice behavior in the target task, participants' reported feelings under different-choice priming conditions were reverse scored. The overall correlation between the recoded feelings of boredom and the number of different choices made in the target task that involved both priming conditions was significant ($r=.37$, $p<.001$). Furthermore, mediation analyses indicated that although the effect of priming on the number of different choices made in the target task was significant ($\beta=.56$, $p<.01$), this effect was reversed when the effect of boredom (as recoded) was taken into account ($\beta=-.71$, $p=.19$). A Sobel test confirmed this conclusion ($z=2.97$, $p<.005$).

Discussion

Experiment 2 confirmed our assumption that when participants were required to use the same-response strategy repeatedly for a greater number of trials, the effect of boredom they experienced as a result of doing so would override the effects of the production that was activated by the priming task and lead them to switch to a different strategy when performing the product choice task. Thus, requiring participants to respond to six sets of questions in the priming task reversed the effect that we observed in Experiment 1 when only three repetitions were required. In addition, correlational analyses provided clear evidence that feelings of boredom had a negative impact on the likelihood of repeating the strategy employed in the priming task when making product choices.

The decrease in variety seeking we observed in different-response priming conditions is worth noting in the context of evidence that feelings of boredom generally *increase* preferences for variety (Inman, 2001; Menon & Kahn, 1995). These apparently contrasting results emphasize the distinction between variation in the application of a response rule and variety in the choices that result from applying this rule (see footnote 1). In the present study, boredom resulted from repeating the same *behavior*, which in different-response priming conditions resulted from repeatedly distributing their responses over a common set of choice alternatives in each of six sets of questions. Previous research suggests that people attempt to cope with the problem that gives arise to their negative feelings when they are conscious of this problem (Shen & Wyer, 2008b). Therefore, participants in these conditions were more likely to relieve their boredom by changing their response rule even though it resulted in a decrease in the variety of products they chose.

An ambiguity in interpreting these findings results from the fact that participants reported their feelings of boredom before performing the target task. This could have increased participants' sensitivity both to the procedure they had employed and the feelings that resulted from it, and artifactually increased their tendency to use their feelings as a basis for the decision strategy they employed. However, the results of Experiment 3, which confirmed the conclusions of the present experiment, are not susceptible to this interpretation.

Experiment 3

The results of Experiment 2 confirmed our assumption that the repeated application of a response strategy can produce boredom and that these feelings can produce a shift in the decision strategy that participants apply in a situation they encounter a short time later. However, this experiment did not look at the relative influence of feelings and procedural

knowledge production that is activated by the priming task. As noted earlier, feelings of boredom are likely to dissipate quickly, particularly if participants are induced to perform unrelated activities during the interim. After a period of time has elapsed in which participants are distracted by performing other activity, the effects of these motives may be less apparent and the impact of procedural knowledge activation may be more evident.

Experiment 3 investigated this possibility. Participants initially performed either three or six repetitions of the product choice task that we employed in related-priming conditions of Experiment 1. Then, they performed the target choice task used in the first experiment either after performing an interpolated task for either 3 min or 20 min. We expected that when only three repetitions of the priming task were performed and participants' attention was not explicitly called to their feelings of boredom, these feelings might not be sufficiently intense to override the effects of the production that was activated by the tasks. To this extent, the strategy that participants employed should have a positive effect on the strategy they used in the target task, as in Experiment 1. However, performing six repetitions of the priming task should increase the intensity of the boredom participants experience and should increase their likelihood of consciously deciding to apply a different strategy in performing the target task, as in Experiment 2.

As noted earlier, however, boredom is quite transitory and is likely to decrease over time. The accessibility of a production that is activated by the priming task is also likely to decrease over time, but the rate of this decrease should be relatively less. (For evidence of the persisting effects of activating a cognitive production, see Smith, 1990.) It was impossible on a priori grounds to predict the relative influence of a production and feelings of boredom at any given point in time. However, the effects of boredom should be most apparent a short time after six repetitions of the decision strategy were performed and these effects should decrease over time, leading the effects of a production activated by these repetitions to be relatively more apparent.

Method

One hundred fifty-four Hong Kong university students were randomly assigned to conditions of a 2 (primed response rule: same response vs. different response) × 2 (frequency of priming: three times vs. six times) × 2 (delay: short vs. long) between-subjects design.

The procedure was similar to that employed in related-priming conditions of Experiment 1. That is, participants completed several shopping questionnaires. In the first shopping questionnaire, participants considered products in either three or six categories and, in each case, were either induced to choose the same option repeatedly or different options repeatedly. The choice tasks employed in three-category priming conditions were identical to those used in Experiment 1. In six-category priming conditions, three additional categories were chosen on the basis of pretesting. Thus, in same-response priming conditions, the categories included print paper, wrap, oil, milk, type of water and brand of water. In different-response priming conditions, they included coffee, potato chips, seaweed, fruit, tonic drink, and juice.

Then, participants in *short-delay* conditions were given an unrelated filler task that took around 3 min, whereas those in *long-delay* conditions were asked to finish a 20-minute filler task. Finally, all participants were given a shopping questionnaire similar to that employed in previous experiments, with the exception that products in two categories (herbal tea and green tea) were chosen, thereby providing a replication. In each case, they predicted the type of product they would choose for use on each of four consecutive days. The number of different choices that participants made in each category was averaged and used as an indication of variety seeking.

Results

Manipulation check

Participants were more likely to choose different options in different-choice priming task ($M=2.83$) than in same-choice priming task ($M=1.65$), F (1, 146) = 118.94, $p<.0001$. This difference did not depend on the number of priming categories ($p>.19$).

Variety seeking in the target task

We expected that when participants applied the decision rule only three times in the priming task and their feeling of boredom were not explicitly called to their attention, these feelings might not be sufficiently intense to override the effects of the production that was activated in the course of performing the task. When participants applied the rule six times, however, we expected the effects of boredom to more evident a short time after the timing task was performed but to decrease over time, leading the impact of procedural knowledge to predominate once again.

Data bearing on these possibilities, summarized in Table 2, are consistent with these speculations. The three-way interaction of decision rule, frequency of priming and delay conditions was significant, F (1, 146) = 8.22, $p<.01$. When participants in short-delay conditions had repeated the priming task three times, they were more likely to choose different options in the target task in different-response priming conditions ($M=2.75$) than in same-response priming conditions ($M=2.24$), F (1, 146) = 3.41, $p<.07$, replicating the findings of Experiment 1. In long-delay conditions, on the other hand, the effect was no

Table 2
Variety seeking as a function of primed decision rule, frequency of priming, and delay— Experiment 3.

	3 priming tasks		6 priming tasks	
	Short delay	Long delay	Short delay	Long delay
Primed decision rule				
Different choice	2.75	2.63	2.36	2.93
Same choice	2.24	2.63	2.88	2.43
M_{diff}	.51	.00	−.52	.50

longer evident (2.63 vs. 2.63), suggesting that the effect of procedural knowledge priming had also dissipated.

When participants were asked to repeat the priming task six times, however, the primed decision strategy had a negative influence on the rule employed in the target task in short-delay conditions (2.36 vs. 2.88 in different-choice priming vs. same-choice priming conditions, F (1, 146)= 3.50, $p<.06$), replicating the findings of Experiment 2. However, this effect was reversed in long-delay conditions (2.93 vs. 2.43, respectively; F (1, 146)=4.24, $p<.04$), indicating that the effect of the production activated by the priming task became apparent once the feelings of boredom had dissipated. In these conditions, the interaction between delay and decision rule was significant (F (1, 146)=7.62, $p<.01$).

Discussion

Experiment 3 confirmed our general hypothesis that repeatedly applying a decision rule can be boring and induce individuals to intentionally apply a different rule in a situation they encounter later. However, the effect of a production that is activated by using the rule is evident after the feelings of boredom have dissipated.

The accessibility of a production that is activated by performing the task, and the feelings of boredom that performing the task elicits, are both likely to increase with the number of times the task is performed. Furthermore, they both decrease over time. However, the relative magnitudes of these effects of these factors appear to differ. Thus, the feelings of boredom elicited by three repetitions of the priming task were apparently not of sufficient intensity to override the effects of the production that was activated by the task (as in Experiment 1). Thus, the decision strategy that participants applied in the priming task had a positive impact under short-delay conditions, but decreased over time as the accessibility of the production it activated diminished. In contrast, repeating the priming task six times increased the intensity of boredom sufficiently to induce participants to choose a different strategy when performing the target task. (Although the mediating effect of boredom was not evaluated in this experiment, it was confirmed in Experiment 2.) However, the accessibility of the production activated by the priming task also increased with the number of repetitions and did not decrease as rapidly over time as feelings of boredom. Thus, the impact of the production became apparent after a long delay when participants' feelings of boredom had dissipated.

The different effects of boredom and procedural priming in the two delay conditions were undoubtedly due in part to the amount of unrelated cognitive activity in which participants were engaged during the interim as well as the time spent engaging in it. (In fact, interpolated activity may have been particularly necessary; asking participants to sit and do nothing for 3–20 min might increase boredom with the experiment, producing effects other than those we observed.) Although the effect of interpolated activity and the effect of time delay per se might be worth distinguishing in future research, this confound does not seriously qualify our conclusions.

General discussion

Although substantial research has investigated the interplay of deliberative and spontaneous decision processes (Hofmann, Strack, & Deutsch, 2008; Childers & Jiang, 2008), our research is the first to demonstrate the different ways in which automatic and deliberative factors combine to influence the choice of decision strategies and the situational factors that influence their relative contribution. In addition, it showed that the effect of activating a response strategy on subsequent behavior can often have a greater impact when participants are not conscious of the reasons for engaging in this behavior. The evidence that these effects can be greater after a period of time has elapsed and the effects of feelings of boredom have diminished (Experiment 3) is particularly provocative. Although we restricted our investigation to decision making in a particular domain, our conclusions seem likely to generalize to other domains in which several choice strategies are potentially applicable (cf. Briley, Morris & Simonson, 2005; Park & Kim, 2005; Simonson & Tversky, 1992).

In conceptualizing these effects, we postulated that two quite different cognitive mechanisms can underlie the use of a decision strategy. First, performing a behavior at one point in time can activate a cognitive production, or sequence of cognitive actions that are applied spontaneously when the preconditions for their occurrence are met with little awareness of the conditions that give rise to them. Second, when individuals are conscious of the procedure they have used in a previous situation, they may be stimulated to think about the strategy they should apply in a new one. This cognitive deliberation can have two opposing effects. If people perceive that a past behavior that they have used effectively is applicable in a similar situation they encounter later, they may deliberately apply it, as Experiment 1 suggests. If their performance of this behavior elicits feelings of boredom, however, and these feelings are salient at the time they make a decision about how to respond in a later situation, they may avoid performing this behavior even if it is potentially relevant. In this case, the positive effect that results from the activation of a production is not likely to be evident until a period of time has elapsed and these feelings have dissipated. Thus, both deliberative and automatic processes can mediate the effect of past behavior on future behavior. Although these effects in isolation have previously been identified, our research goes beyond this work by circumscribing the conditions in which these different effects predominate.

The effect of priming alternative decision strategies on the likelihood of applying them in a new situation may depend in part on whether the strategies are well learned and, therefore, can be applied with little cognitive deliberation. In the present research, both of the strategies we considered (the repeated choice of a given alternative and the choice of a variety of alternatives) are likely to be well-practiced sequences of behavior that are stored in memory either as part of semantic knowledge or in the form of a production (Anderson, 1983). Consequently, only a few exposures to situations that require their use are sufficient to activate them. If the decision strategies

involved are novel, however, and have to be learned at the time of the experiment, the effects of priming we identified might not occur.

The present results should also be evaluated in the context of Drolet's (2002) findings. As we noted earlier, she found evidence that individuals have a general desire for uniqueness and are chronically disposed to change their decision strategy they apply over a series of trials. This disposition may generalize over decision rules. Furthermore, both individual and cultural differences may exist in the magnitude of this disposition (Kim & Drolet, 2003). Feelings of boredom, however, are more likely to be situation specific. Therefore, although people who feel bored with a decision are likely to choose a different one, as our results indicate, these transitory effects and chronic dispositions to seek uniqueness should be distinguished.

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